



Reference: 004323

July 10, 2006

Mr. Mark Verhey  
Humboldt County Division of Environmental Health  
100 H Street, Suite 100  
Eureka, CA 95501

**Subject: Second Quarter 2006 Groundwater Monitoring Report, Former Rio Dell Texaco, 100 Wildwood Avenue; LOP No. 12691**

## Introduction

This letter report comprises the second quarter 2006 groundwater monitoring report for the former Rio Dell Texaco, Rio Dell, Humboldt County, California. This report includes a brief discussion on the background of the site, field activities, groundwater monitoring results, and discussion and recommendations. This work is being performed by SHN Consulting Engineers & Geologists, Inc. (SHN) as required by the Humboldt County Division of Environmental Health (HCDEH).

## Vicinity Information

The site is located at 100 Wildwood Avenue in Rio Dell, Humboldt County, California, at the northeast corner of the intersection of Wildwood Avenue and Edwards Drive (Figure 1). A site plan is included as Figure 2.

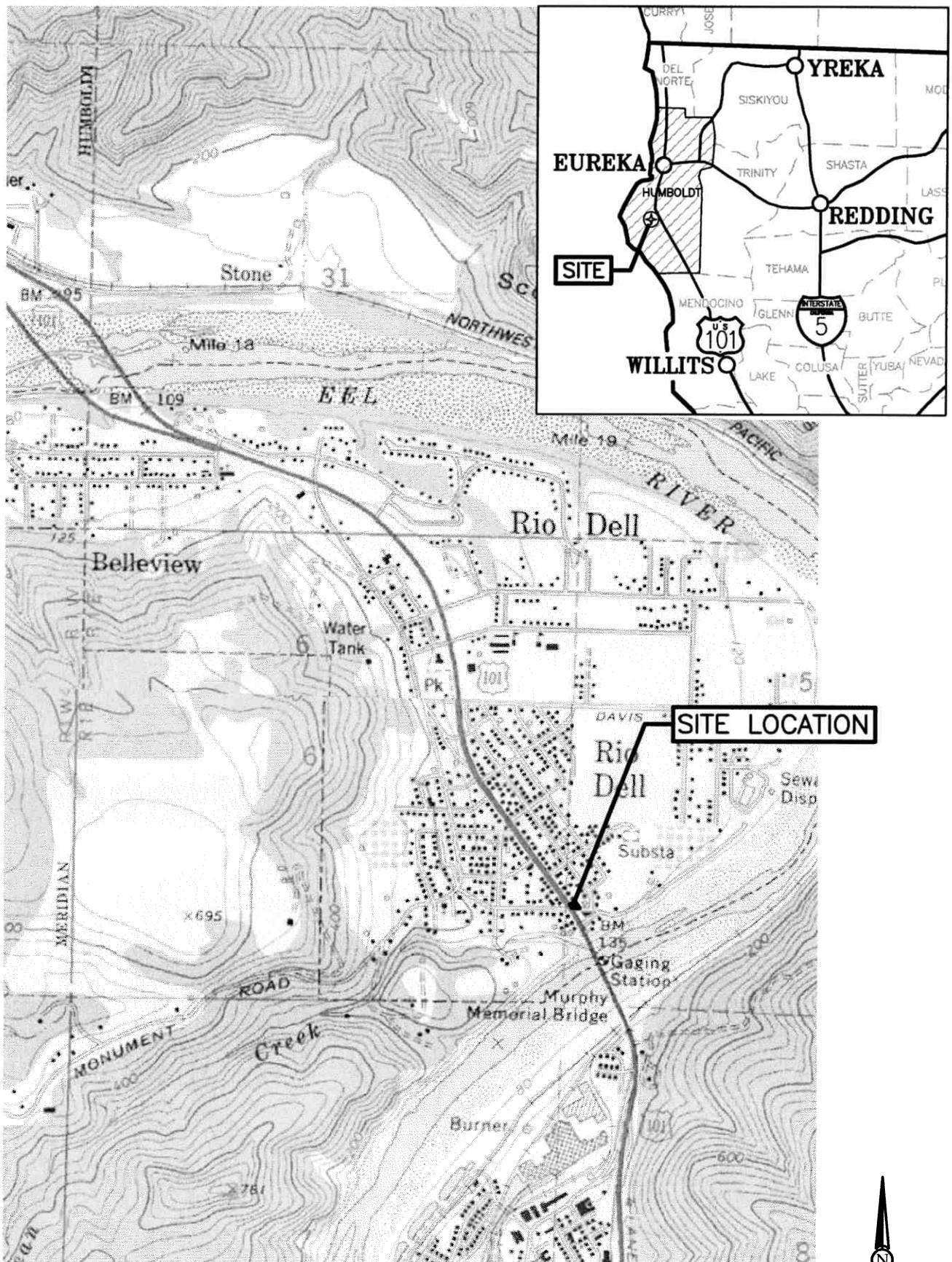
## Background

In December 1990, a 200-gallon waste-oil Underground Storage Tank (UST) was removed from the site. Contaminated soils were excavated from the vicinity of the waste oil UST in August 1992. Laboratory analytical results of soil and groundwater samples collected during the overexcavation indicated the presence of petroleum hydrocarbons in soil, but not in groundwater. In November 1996, the HCDEH issued a remedial action completion certificate for the waste-oil UST (LACO, 1998).

In September and October 1998, Northcoast Environmental Construction removed 6 USTs from the site. Low concentrations of petroleum hydrocarbons were detected in several soil samples from the excavation cavities (LACO, 1998). In February 2000, LACO Associates (LACO) installed 6 soil borings (B-1 through B-6) and 4 monitoring wells (MW-1 through MW-4), and initiated quarterly groundwater monitoring and sampling (LACO, 2000).

In 2001, LACO performed a sensitive receptor survey for a 1,000-foot radius from the site. Two active wells were identified within the search area; one well was reportedly used for irrigation, the other for domestic use and irrigation. Both wells are located crossgradient of the site (LACO, February 2002).

In March and April 2002, LACO installed 8 additional soil borings/temporary well points (B-7 through B-14) at the site (LACO, June 2002).

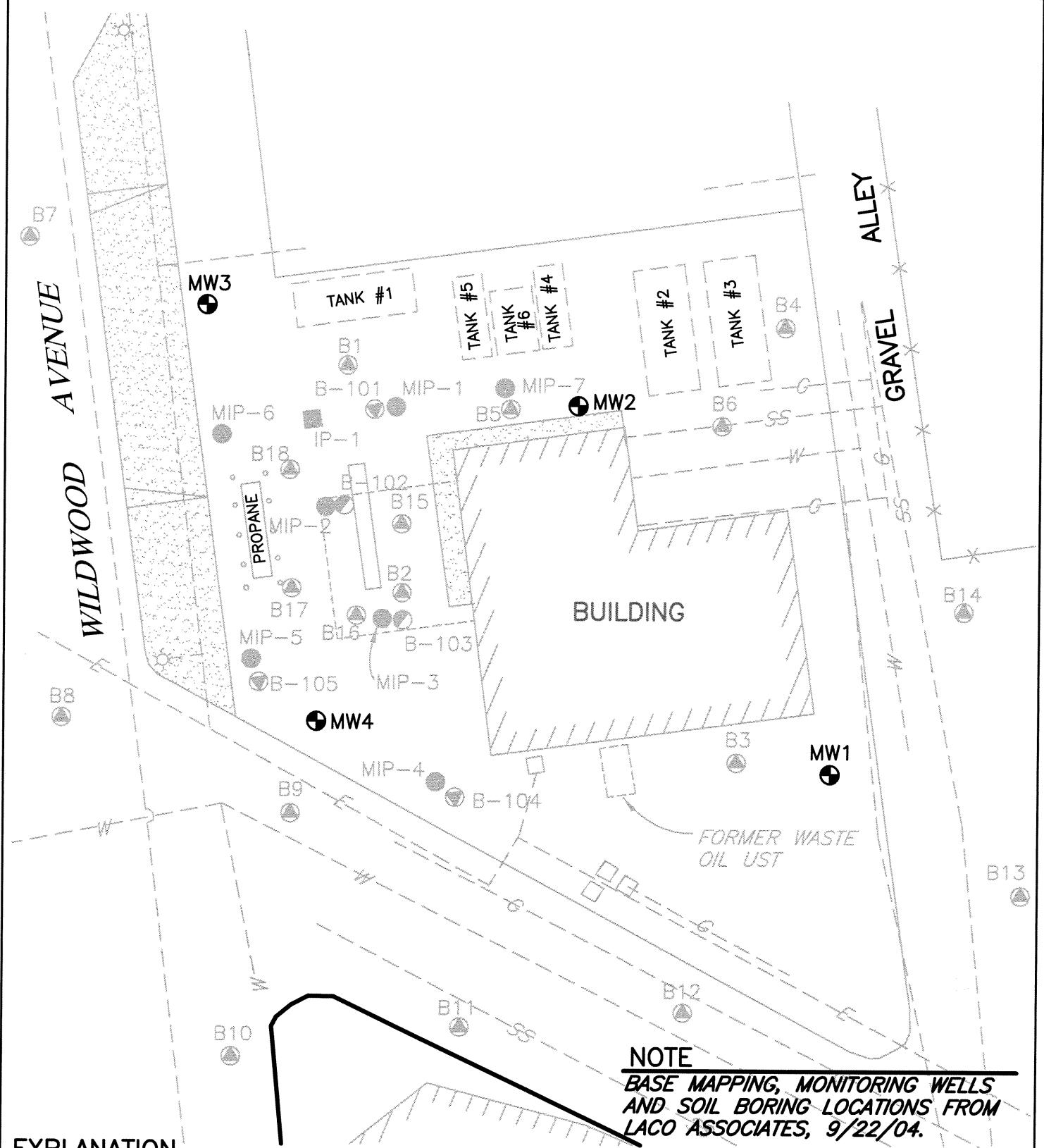


SOURCE: SCOTIA AND RIO DELL  
USGS 7.5 MINUTE QUADRANGLES

1" = 1,500' ±

<b>SW</b> Consulting Engineers & Geologists, Inc.	Former Rio Dell Texaco Rio Dell, California	Site Location Map SHN 004323
	January, 2005	004323-FIG-1

Figure 1



Mark Verhey

**Second Quarter 2006 Groundwater Monitoring Report, Former Rio Dell Texaco; LOP No. 12691**

July 10, 2006

Page 2

In January 2004, LACO installed 4 additional soil borings/temporary well points (B-15 through B-18) at the site (LACO, 2004).

Historic groundwater monitoring data collected by LACO are included in Attachment 1.

In October 2005, SHN supervised the installation of 7 Membrane Interface Probe (MIP) borings, 5 soil borings, and 3 temporary well points. Soil and groundwater samples were collected for a chemical oxidation treatability study (SHN, 2006).

On October 3, 2005, SHN supervised Fisch Drilling in the installation of seven MIP borings (SHN, 2006). The detectors used during the investigation included a Photoionization Detector (PID) and a Flame Ionization Detector (FID).

On October 4, 2005, SHN supervised Fisch Drilling in the installation of five soil borings (B-101 through B-105) (SHN, 2006). Six soil samples were submitted for laboratory analysis for petroleum hydrocarbons. Two soil samples were submitted for analysis of physical properties. Two soil samples from B-101 and B-102 (at 6.5 feet BGS) were submitted for the chemical oxidation treatability study. Three groundwater samples were collected from temporary well points. Three groundwater samples were submitted for petroleum hydrocarbon analysis, and one groundwater sample from B-101 was submitted for the chemical oxidation treatability study. One temporary injection point (IP-1) was installed at the site. The injection point was constructed using 1.5-inch diameter hollow stainless steel rods with a 4-foot long injection tip. The rods were driven to the first injection depth (9-feet BGS), and then retracted, exposing the injection tip from 5 to 9 feet BGS. A Geoprobe® GS-1100 grout pump was used to pump potable water from the municipal water supply into the formation. After injection of approximately 10 gallons of water, the rods were advanced to 14 feet BGS and retracted exposing the injection tip from 10 to 14 feet BGS. Approximately 10 gallons of water was injected at the deeper interval

On January 6, 2006, SHN conducted rising head slug tests in monitoring wells MW-1, MW-2, and MW-4 (SHN, 2006). A clean disposable bailer was advanced into each well and the water level was allowed to equilibrate. The bailer was removed and the water level response was measured using a down-hole pressure transducer. The Bower-Rice Method was then used to calculate the hydraulic conductivity. An average hydraulic conductivity of 4.6 feet per day was calculated for monitoring well MW-1, 0.05 feet per day for well MW-2, and 7.9 feet per day for monitoring well MW-4. Using an average gradient of 0.1 (from the last four quarterly groundwater monitoring events), the average hydraulic conductivity value (4.2 feet per day), and an estimated effective porosity of 25%, a seepage velocity of 1.7 feet per day or 613 feet per year was calculated.

## **Field Activities**

### **Monitoring Well Sampling**

On May 8, 2006, SHN conducted quarterly groundwater monitoring of site monitoring wells MW-1 through MW-4. Prior to sample collection, each well was checked for the presence of free product (none was observed), and measured for depth to groundwater to the nearest 0.01 foot.

Approximately 3 casing volumes of water were subsequently purged from each monitoring well, using a disposable bailer. Electrical conductivity, pH, and temperature were monitored

Mark Verhey

**Second Quarter 2006 Groundwater Monitoring Report, Former Rio Dell Texaco; LOP No. 12691**

July 10, 2006

Page 3

periodically during purging activities using portable instrumentation. Each groundwater well was also monitored for Dissolved Oxygen (DO), Dissolved Carbon Dioxide (DCO<sub>2</sub>), and Oxidation-Reduction Potential (ORP).

Groundwater samples were collected from each monitoring well, using disposable polyethylene bailers, and transferred into laboratory-supplied bottles. The water samples were then labeled, stored in an iced cooler, and transported to the analytical laboratory under proper chain-of-custody documentation. Groundwater monitoring data sheets are included in Attachment 2.

### **Laboratory Analysis**

Each groundwater sample was analyzed for Total Petroleum Hydrocarbons as Gasoline (TPHG); Benzene, Toluene, Ethylbenzene, and total Xylenes (BTEX); Methyl Tertiary-Butyl Ether (MTBE); Tertiary-Butyl Alcohol (TBA); Diisopropyl Ether (DIPE); Ethyl Tertiary-Butyl Ether (ETBE); and Tertiary-Amyl Methyl Ether (TAME), in general accordance with United States Environmental Protection Agency (EPA) Method No. 8260B.

Groundwater samples were submitted to North Coast Laboratories, Inc., a State of California-certified analytical laboratory located in Arcata, California.

### **Equipment Decontamination Procedures**

All small equipment that required on-site cleaning was cleaned using the triple-wash system. The equipment was first washed in a water solution containing Liquinox® cleaner, followed by two distilled water rinses.

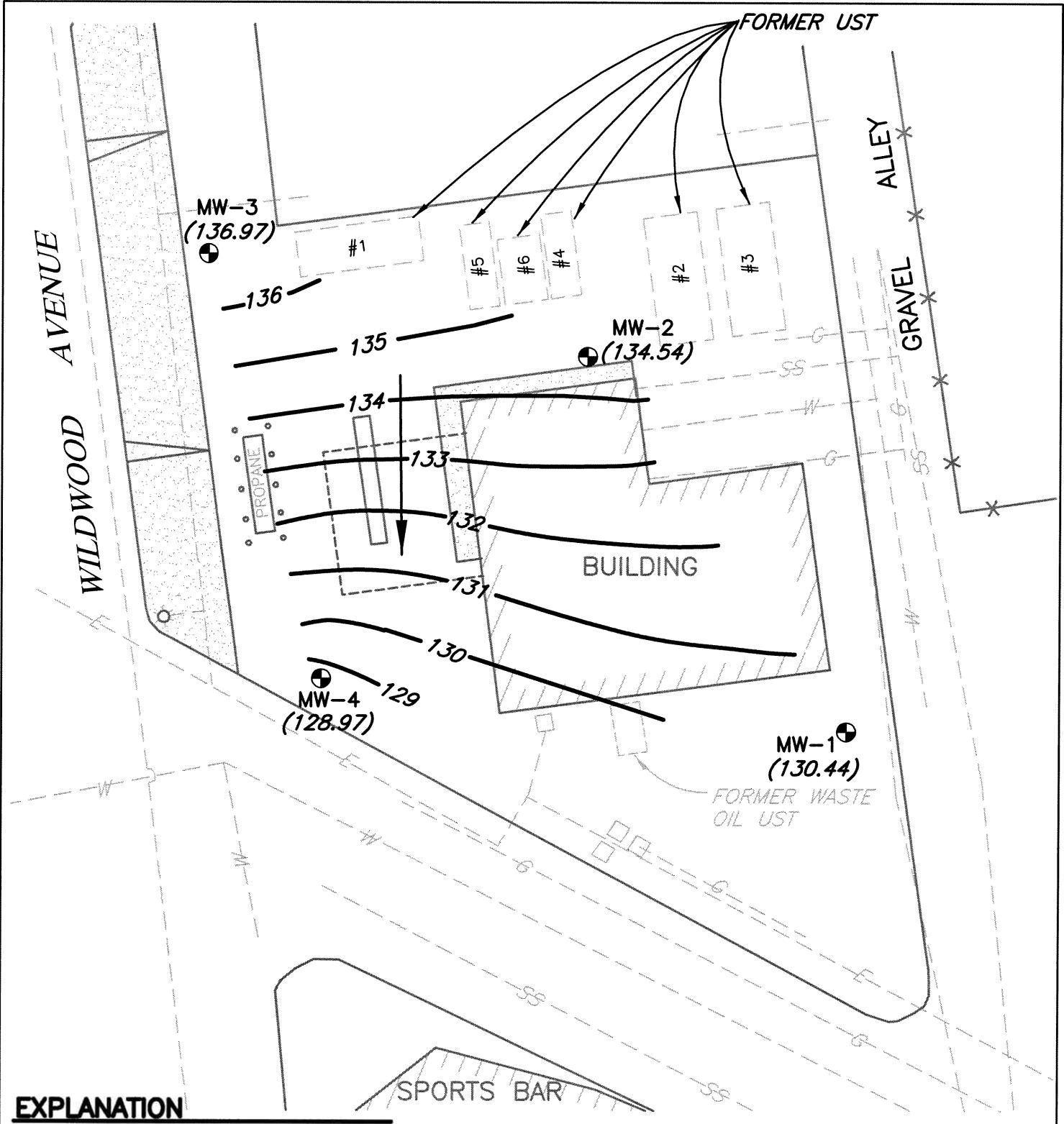
### **Investigation-Derived Waste Management**

Water used in the decontamination of equipment, tools, and all purge water was contained in Department of Transportation (DOT)-approved DOT 17E/H, 55-gallon drums. The water was transported to SHN's purge water storage facility and will be discharged, under permit, to the City of Eureka wastewater collection system. A total of 19 gallons of water was generated during this monitoring event. A discharge receipt is included in Attachment 2. A discharge receipt for the 21 gallons of purge water from February 6, 2006, groundwater-monitoring activities is also included in Attachment 2.

## **Groundwater Monitoring Results**

### **Hydrogeology**

Depth-to-groundwater measurements were collected on May 8, 2006. Using this information, direction of groundwater flow was estimated to be to the southeast with an approximate gradient of 0.13 (Figure 3). Groundwater elevations are presented in Table 1. Historic groundwater elevation data collected by SHN are included in Attachment 3.



### EXPLANATION

MW-2 MONITORING WELL  
LOCATION AND DESIGNATION

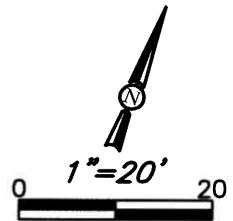
(129.70) GROUNDWATER ELEVATION  
IN FEET (NAVD 88)

— 132 — GROUNDWATER CONTOUR  
(NAVD 88)

← APPROXIMATE DIRECTION  
OF GROUNDWATER FLOW

### NOTE

BASE MAPPING, MONITORING WELLS  
AND SOIL BORING LOCATIONS FROM  
LACO ASSOCIATES, 9/22/04.



Mark Verhey

**Second Quarter 2006 Groundwater Monitoring Report, Former Rio Dell Texaco; LOP No. 12691**

July 10, 2006

Page 4

**Table 1**  
**Groundwater Elevations, May 8, 2006**  
**Former Rio Dell Texaco, Rio Dell, California**

Sample Location	Top of Casing Elevation (feet) <sup>1</sup>	Depth to Water (feet) <sup>2</sup>	Groundwater Elevation (feet) <sup>1</sup>
MW-1	139.06	8.62	130.44
MW-2	139.83	5.29	134.54
MW-3	139.87	2.90	136.97
MW-4	139.00	10.03	128.97

1. Referenced to North American Vertical Datum 1988 (NAVD88)  
2. Below top of casing

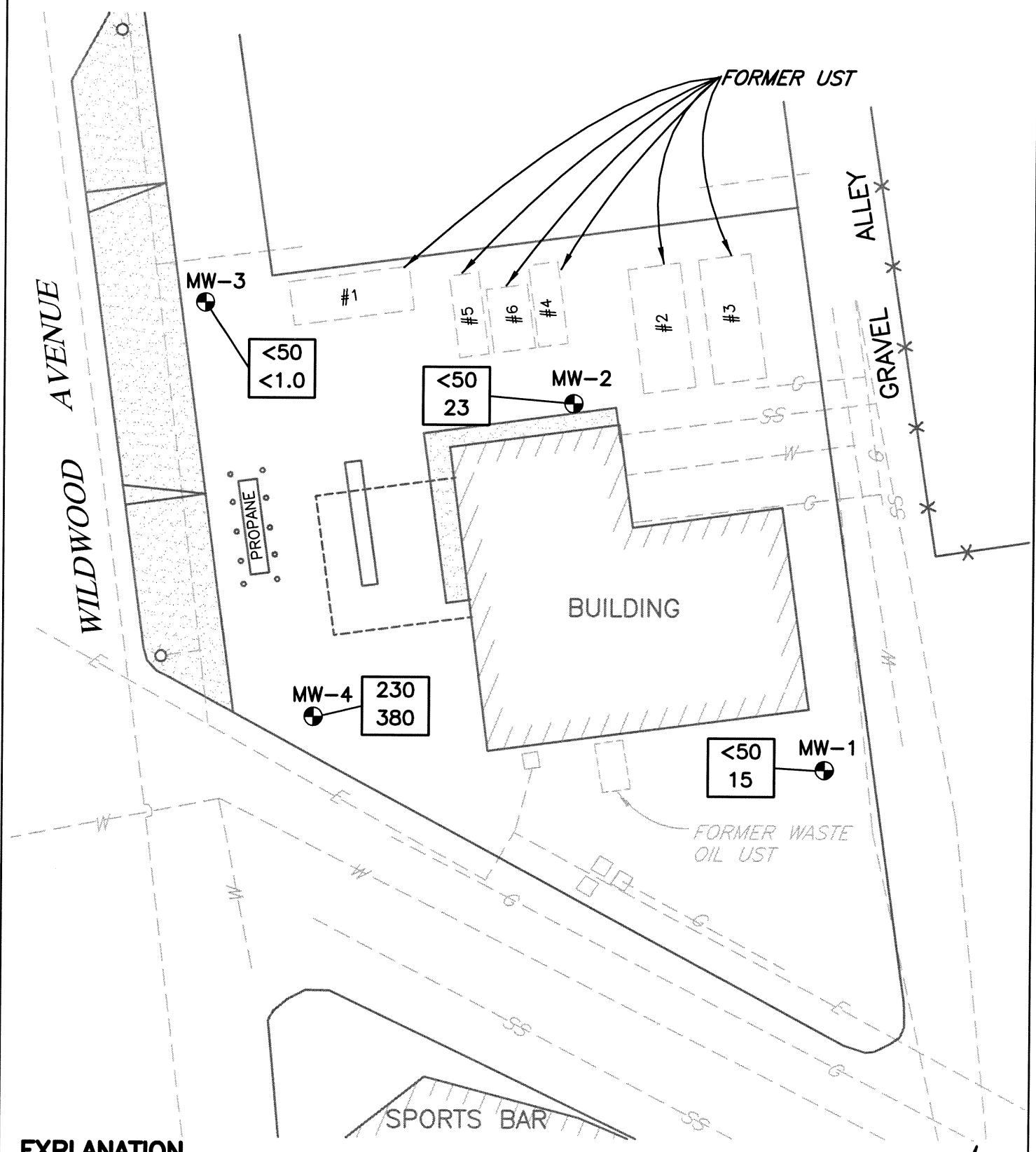
## Groundwater Analytical Results

Groundwater was sampled from each well on May 8, 2006. TPHG was detected in the groundwater sample from monitoring well MW-4. However, the analytical laboratory noted that the reported TPHG concentration was actually fuel oxygenate constituents that eluted in the TPHG range of molecular weights. Analytical results are presented in Table 2 and summarized on Figure 4. Historic groundwater analytical data collected by SHN are included in Attachment 3. The laboratory analytical report is presented in Attachment 4.

**Table 2**  
**Groundwater Analytical Results, May 8, 2006**  
**Former Rio Dell Texaco; Rio Dell, California**  
(in ug/L)<sup>1</sup>

Sample Location	TPHG <sup>2</sup>	B <sup>2</sup>	T <sup>2</sup>	E <sup>2</sup>	X <sup>2</sup>	MTBE <sup>2</sup>	TBA <sup>2</sup>	DIPE <sup>2</sup>	ETBE <sup>2</sup>	TAME <sup>2</sup>
MW-1	<50 <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	15	<10	<1.0	<1.0	<1.0
MW-2	<50	<0.50	<0.50	<0.50	<0.50	23	<10	<1.0	<1.0	1.1
MW-3	<50	<0.50	<0.50	<0.50	<0.50	<1.0	<10	<1.0	<1.0	<1.0
MW-4	230 <sup>4</sup>	<0.50	<0.50	<0.50	<0.50	380	<10	<1.0	<1.0	3.9

1. ug/L: micrograms per Liter
2. Total Petroleum Hydrocarbons as Gasoline (TPHG), Benzene (B), Toluene (T), Ethylbenzene (E), total Xylenes (X), Methyl Tertiary-Butyl Ether (MTBE), Tertiary-Butyl Alcohol (TBA), Diisopropyl Ether (DIPE), Ethyl Tertiary-Butyl Ether (ETBE), and Tertiary-Amyl Methyl Ether (TAME) analyzed in general accordance with United States Environmental Protection Agency (EPA) Method No. 8260B.
3. <: Denotes a value that is "less than" the method detection limit.
4. The reported gasoline value is primarily the result of reported gasoline additives present in the sample.



## Natural Attenuation Parameters

DO, DCO<sub>2</sub>, and ORP were measured in the monitoring wells prior to sampling. Results are presented in Table 3.

**Table 3**  
**DO, DCO<sub>2</sub> and ORP Measurement Results, May 8, 2006**  
**Former Rio Dell Texaco, Rio Dell, California**

Sample Location	DO <sup>1</sup> (ppm) <sup>2</sup>	DCO <sub>2</sub> <sup>3</sup> (ppm) <sup>2</sup>	ORP <sup>4</sup> (mV) <sup>5</sup>
MW-1	2.98	80	226
MW-2	1.90	80	220
MW-3	2.91	35	222
MW-4	3.81	200	227

1. DO: Dissolved Oxygen, field measured using portable instrumentation  
2. ppm: parts per million  
3. DCO<sub>2</sub>: Dissolved Carbon Dioxide, field measured using a field test kit  
4. ORP: Oxidation-Reduction Potential, field measured using portable instrumentation  
5. mV: millivolts

The DCO<sub>2</sub> measurements ranged from 35 ppm in well MW-3 to 200 ppm in well MW-4 and indicate biodegradation is occurring. DO measurements ranged from 1.90 ppm in well MW-2 to 3.81 ppm in well MW-4 and are sufficient to support aerobic degradation. ORP measurements ranged from 220 mV in well MW-2 to 227 mV in well MW-4 and indicate mildly oxidizing conditions exist in site groundwater. Historic DO, ORP, and DCO<sub>2</sub> measurement results collected by SHN are included in Attachment 3.

## Discussion and Recommendations

Due to the similarity in TPHG concentrations to MTBE concentrations found in site wells, it appears that petroleum hydrocarbons being reported as TPHG is actually MTBE that is eluting in the TPHG range of molecular weights.

The biodegradation indicators indicate that biodegradation of petroleum hydrocarbons is occurring.

SHN is preparing a corrective action plan as requested by the HCDEH.

SHN will continue groundwater monitoring, as required by the HCDEH. Prior to groundwater sampling, wells will be checked for depth-to-water, and monitored for DO, DCO<sub>2</sub>, and ORP. Wells will be purged of approximately 3 well casing volumes prior to sampling. During well purging, groundwater will be monitored for temperature, pH, and conductivity. Groundwater samples will be analyzed for TPHG, BTEX, and fuel oxygenates.

SHN will complete and submit the next quarterly monitoring report no later than 60 days following the quarterly sampling event. The report will include a description of the monitoring

Mark Verhey

**Second Quarter 2006 Groundwater Monitoring Report, Former Rio Dell Texaco; LOP No. 12691**

July 10, 2006

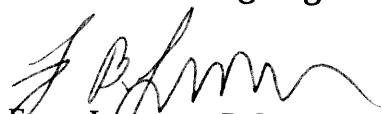
Page 6

and sampling activities, a summary of results, analytical reports, groundwater elevations, and a groundwater contour map. The next quarterly groundwater-monitoring event is scheduled for August 2006.

If you have any questions regarding the work completed, please call me at 707/441-8855.

Sincerely,

**SHN Consulting Engineers & Geologists, Inc.**



Frans Lowman, P.G.  
Project Manager

FBL/ADM:lms

- Attachments:
1. Historic Monitoring Data Collected by LACO
  2. Field Notes
  3. Historic Monitoring Data Collected by SHN
  4. Laboratory Analytical Report

copy w/ attach: Ms. Dorothy Bianchi



## References Cited

- LACO Associates. (November 1998). *UST Closure Report, Rio Dell Texaco*. Eureka: LACO
- . (May 2000). *Initial Subsurface Investigation Status Report, Boring and Monitoring Well Installation, Rio Dell Texaco*. Eureka: LACO.
- . (February 2002). *Results of Sensitive Receptor Survey, Former Rio Dell Texaco*. Eureka: LACO.
- . (June 2002). *Subsurface Investigation Status Report, Report of Findings: Boring Installation, Former Rio Dell Texaco*. Eureka: LACO.
- . (February 2004). *Subsurface Investigation Status Report, Former Rio Dell Texaco*. Eureka: LACO.
- SHN Consulting Engineers and Geologists, Inc. (March 2006). *Subsurface Investigation Report of Findings, Former Rio Dell Texaco*. Eureka: SHN.

**Attachment 1**

---

**Historic Monitoring Data Collected by LACO**

TABLE 1: WELL DATA AND GROUNDWATER ANALYTICAL RESULTS  
Former Rio Dell Texaco, 100 Wildwood Ave, Rio Dell, CA  
LACO No. 3554.03; LOP No. 12691

WELL/ Sample Date	Groundwater Measurements			Analytical Results							
	Well Head Elevation (feet, NAVD88)	Ground water Elevation (feet, NAVD88)	Depth to Water (feet)	TPHg ( $\mu\text{g/L}$ )	TPHd ( $\mu\text{g/L}$ )	Benzene ( $\mu\text{g/L}$ )	Toluene ( $\mu\text{g/L}$ )	Ethylbenzene ( $\mu\text{g/L}$ )	Xylenes ( $\mu\text{g/L}$ )	MTBE ( $\mu\text{g/L}$ )	Other Analytes ( $\mu\text{g/L}$ )
MW-1	139.06										
2/24/2000	132.61	6.45		ND<50	—	ND<0.50	ND<0.50	ND<0.50	1.2	4.3	ND<0.50-50
3/21/2000	132.00	7.06		—	—	—	—	—	—	—	—
4/18/2000	131.49	7.57		—	—	—	—	—	—	—	—
5/26/2000	131.19	7.87		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	2.5	ND<0.50-50
6/30/2000	130.52	8.54		—	—	—	—	—	—	—	—
7/31/2000	131.27	7.79		—	—	—	—	—	—	—	—
8/30/2000	128.45	10.61		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	88	1,2-Dichloroethane = 0.94
9/22/2000	128.14	10.92		—	—	—	—	—	—	—	—
10/26/2000	127.98	11.08		—	—	—	—	—	—	—	—
11/14/00	129.81	9.25		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	7.8	ND<0.50-50
12/12/2000	130.25	8.81		—	—	—	—	—	—	—	—
1/12/2001	131.44	7.62		—	—	—	—	—	—	—	—
2/22/2001	132.33	6.73		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50-50
4/5/2001	131.38	7.68		—	—	—	—	—	—	—	—
5/2/2001	131.16	7.90		—	—	—	—	—	—	—	—
5/22/2001	130.73	8.33		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	4.1	ND<0.50-50
6/11/2001	130.08	8.98		—	—	—	—	—	—	—	—
7/6/2001	129.87	9.19		—	—	—	—	—	—	—	—
9/4/2001	127.97	11.09		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	120	1,2-Dichloroethane = 1.3
11/29/2001	131.27	7.79		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	0.61	ND<0.50-50
2/28/2002	131.80	7.26		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	2.6	ND<0.50-50
5/20/2002	130.77	8.29		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	2.3	ND<0.50-50
8/8/2002	128.51	10.55		53	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	100	ND<0.50-50
				Monitoring well top of casings resurveyed 8/15/02							
12/6/2002	128.48	10.58		66	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	90	TBA=110
2/24/2003	131.67	7.39		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	1,2-Dichloroethane=1.0
5/15/2003	131.33	7.73		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	7.0	All others ND<1.0 ND<0.50-50
8/11/2003	129.58	9.48		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	36.0	ND<0.50-20
11/11/2003	129.15	9.91		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	1.43	ND<1.0-20
2/17/2004	132.19	6.87		—	—	—	—	—	—	4.4	ND<1.0-20
5/10/2004	131.48	7.58		—	—	—	—	—	—	—	—
8/17/2004	128.47	10.59		94	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	87	ND<1.0-10
MW-2	139.83										
2/24/2000	137.21	2.62		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	92	TAME = 0.66
3/21/2000	137.28	2.55		—	—	—	—	—	—	—	1,2-Dichloroethane=2.8
4/18/2000	137.82	2.01		—	—	—	—	—	—	—	All others ND<0.50-50
5/26/2000	NA	NA		330	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	33	ND<0.50 to 100
6/30/2000	NA	NA		—	—	—	—	—	—	—	—
7/31/2000	NA	NA		—	—	—	—	—	—	—	—
8/30/2000	126.18	10.63		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	100	TAME = 0.99
9/22/2000	inaccessible			—	—	—	—	—	—	—	1,2-Dichloroethane=2.9
10/26/2000	inaccessible			—	—	—	—	—	—	—	All others ND<0.50-50
11/14/00	134.78	5.05		100	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	37	TAME = 0.55
12/12/2000	136.02	3.81		—	—	—	—	—	—	—	1,2-Dichloroethane=0.71
1/12/2001	136.27	3.56		—	—	—	—	—	—	—	All others ND<0.50-50
2/22/2001	136.53	3.30		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	44	TAME = 0.58
4/5/2001	136.50	3.33		—	—	—	—	—	—	—	1,2-Dichloroethane=2.3
5/2/2001	136.34	3.49		—	—	—	—	—	—	—	All others ND<0.50-50
5/22/2001	135.09	4.74		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	65	1,2-Dichloroethane=2.1
6/11/2001	134.38	5.45		—	—	—	—	—	—	—	All others ND<0.50-50
7/6/2001	134.17	5.66		—	—	—	—	—	—	—	—
9/4/2001	132.42	7.41		ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	58	TAME = 2.2
											1,2-Dichloroethane=2.4
											All others ND<0.50-50

TABLE 1: WELL DATA AND GROUNDWATER ANALYSIS  
Former Rio Dell Texaco, 100 Wildwood Ave, Rio Dell, CA  
LACO No. 3554.03; LOP No.12691

WELL RESULTS

WELL/ Sample Date	Groundwater Measurements			Analytical Results							
	Well Head Elevation (feet, NAVD88)	Ground water Elevation (feet, NAVD88)	Depth to Water (feet)	TPHg ( $\mu\text{g/L}$ )	TPHd ( $\mu\text{g/L}$ )	Benzene ( $\mu\text{g/L}$ )	Toluene ( $\mu\text{g/L}$ )	Ethylbenzene ( $\mu\text{g/L}$ )	Xylenes ( $\mu\text{g/L}$ )	MTBE ( $\mu\text{g/L}$ )	Other Analytes ( $\mu\text{g/L}$ )
<b>MW2 continued</b>											
11/29/2001	136.87	2.96	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	35	TAME = 1.2 1,1-Dichloroethane=2.8 All others ND<0.50-50	
2/28/2002	136.56	3.27	100	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	33	TAME = 1.2 1,1-Dichloroethane=2.2 All others ND<0.50-50	
5/20/2002	134.88	4.95	57	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	37	TAME = 2.1 1,1-Dichloroethane=2.1 All others ND<0.50-50	
8/8/2002	133.03	6.80	120	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	21	TAME = 1.2 1,1-Dichloroethane=1.2 All others ND<0.50-50	
Monitoring well top of casings resurveyed 8/15/02											
12/6/2002	133.04	6.79	59	ND<50	0.62	0.98	0.60	1.95	41	TAME=2.8 1,1-Dichloroethane=3.1 All others ND<1.0-20	
2/24/2003	136.49	3.34	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	26	TAME=1.7 1,1-Dichloroethane=2.8 All others ND<1.0-20	
5/15/2003	136.44	3.39	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	21	TAME=1.2 1,1-Dichloroethane=2.1 All others ND<1.0-20	
8/11/2003	133.90	5.93	150	—	ND<0.50	ND<0.50	ND<0.50	0.70	9.5	ND<1.0-20	
11/11/2003	134.11	5.72	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	18	TAME=1.2 1,1-Dichloroethane=1.3 All others ND<1.0-20	
2/17/2004	136.35	2.71	—	—	—	—	—	—	—	—	
5/10/2004	135.88	3.18	—	—	—	—	—	—	—	—	
8/17/2004	132.28	6.78	120	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	6.9	ND<1.0-10	
<b>MW-3</b>											
2/24/2000	139.87	1.60	ND<50	—	ND<0.50	ND<0.50	ND<0.50	1	21	ND<0.50-50	
3/21/2000	137.87	2.00	—	—	—	—	—	—	—	—	
4/18/2000	138.20	1.67	—	—	—	—	—	—	—	—	
5/26/2000	137.51	2.36	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	9.8	ND<0.50-50	
6/30/2000	136.74	3.13	—	—	—	—	—	—	—	—	
7/31/2000	135.42	4.45	—	—	—	—	—	—	—	—	
8/30/2000	134.37	5.50	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	17	ND<0.50-50	
9/22/2000	134.34	5.53	—	—	—	—	—	—	—	—	
10/26/2000	135.28	4.59	—	—	—	—	—	—	—	—	
11/24/00	137.27	2.60	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	17	ND<0.50-50	
12/12/2000	137.43	2.44	—	—	—	—	—	—	—	—	
1/12/2001	138.06	1.81	—	—	—	—	—	—	—	—	
2/22/2001	137.99	1.88	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	0.61	ND<0.50-50	
4/5/2001	138.00	1.87	—	—	—	—	—	—	—	—	
5/2/2001	137.76	2.11	—	—	—	—	—	—	—	—	
5/22/2001	137.01	1.86	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	4.1	ND<0.50-50	
6/11/2001	136.28	3.59	—	—	—	—	—	—	—	—	
7/6/2001	136.15	3.72	—	—	—	—	—	—	—	—	
9/4/2001	134.07	5.80	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	6.4	All ND<0.50-500 Methylol=77 All others ND<0.50-50	
11/29/2001	137.79	2.08	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	3.8	Methylol=77 All others ND<0.50-50	
2/28/2002	138.02	1.85	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	2.2	All ND<0.50-50	
5/20/2002	137.62	2.25	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	1.4	All ND<0.50-50	
8/8/2002	134.89	4.98	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	1.6	All ND<0.50-50	
Monitoring well top of casings resurveyed 8/15/02											
12/6/2002	135.38	4.49	ND<50	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	4.2	All ND<0.50-20	
2/24/2003	138.03	1.84	ND<50	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	1.0	All ND<0.50-20	
5/15/2003	138.22	1.65	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	All ND<0.50-20	
8/11/2003	135.69	4.18	ND<50	—	ND<0.50	ND<0.50	ND<0.50	0.75	1.5	ND<1.0-20	
11/11/2003	136.76	3.11	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	1.5	ND<1.0-20	
2/17/2004	137.89	1.17	—	—	—	—	—	—	—	—	
5/10/2004	137.58	1.48	—	—	—	—	—	—	—	—	
8/17/2004	134.07	4.99	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<1.0-10	
<b>MW-4</b>											
2/24/2000	131.12	7.88	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	350	TAME = 2.8 1,1-Dichloroethane=28 All others ND<0.50-500	
3/21/2000	133.16	5.84	—	—	—	—	—	—	—	—	
4/18/2000	133.40	5.60	—	—	—	—	—	—	—	—	

TABLE 1: WELL DATA AND GROUNDWATER ANALYTICAL RESULTS  
Former Rio Dell Texaco, 100 Wildwood Ave, Rio Dell, CA  
LACO No. 3554.03; LOP No.12691

WELL/ Sample Date	Groundwater Measurements			Analytical Results							
	Well Head Elevation (feet, NAVD88)	Ground water Elevation (feet, NAVD88)	Depth to Water (feet)	Analytical Results							
				TPHg ( $\mu\text{g/L}$ )	TPHd ( $\mu\text{g/L}$ )	Benzene ( $\mu\text{g/L}$ )	Toluene ( $\mu\text{g/L}$ )	Ethylbenzene ( $\mu\text{g/L}$ )	Xylenes ( $\mu\text{g/L}$ )	MTBE ( $\mu\text{g/L}$ )	Other Analytes ( $\mu\text{g/L}$ )
<b>MW-4 cont'd</b>											
5/26/2000	133.30	5.70	1,000	—	ND<2.0	ND<2.0	6	ND<2.0	230	TAME = 2.5 TBA = 44 All others ND<2.0 to 1000	—
6/30/2000	132.67	6.33	—	—	—	—	—	—	—	—	—
7/31/2000	132.38	6.62	—	—	—	—	—	—	—	—	—
8/30/2000	129.45	6.52	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	220	TAME = 3.9 1,2-Dichloroethane=20 TBA = 5.6	—
9/22/2000	130.55	8.45	—	—	—	—	—	—	—	—	—
10/26/2000	130.38	8.62	—	—	—	—	—	—	—	—	—
11/24/00	131.82	7.18	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	620	TAME = 6.1 1,2-Dichloroethane=16 TBA = 9.6	—
12/12/2000	132.31	6.69	—	—	—	—	—	—	—	—	—
1/12/2001	132.83	6.17	—	—	—	—	—	—	—	—	—
2/22/2001	133.44	5.56	280	—	ND<1.0	ND<1.0	ND<1.0	ND<1.0	350	TAME = 4.1 1,2-Dichloroethane=4.5 TBA = 47	—
4/5/2001	133.63	5.37	—	—	—	—	—	—	—	—	—
5/2/2001	133.60	5.40	—	—	—	—	—	—	—	—	—
5/22/2001	133.35	5.65	210	—	ND<1.0	ND<1.0	ND<1.0	ND<1.0	380	TAME = 4.5 1,2-Dichloroethane=6.2 TBA = 34	—
6/11/2001	132.14	6.86	—	—	—	—	—	—	—	—	—
7/6/2001	132.01	6.99	—	—	—	—	—	—	—	—	—
9/4/2001	130.39	8.61	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	350	TAME = 5.4 1,2-Dichloroethane=12 All others ND<0.50-500	—
11/29/2001	132.58	6.42	ND<50	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	220	TAME = 1.5 1,2-Dichloroethane=3.7 Methanol 58 All others ND<0.50-50	—
2/28/2002	133.39	5.61	780	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	300	TAME = 3.3 1,2-Dichloroethane=2.3 TBA = 38 All others ND<0.50-50	—
5/20/2002	133.35	5.65	450	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	450	TAME = 4.6 1,2-Dichloroethane=6.8 TBA = 21 All others ND<0.50-50	—
8/8/2002	130.53	8.47	270	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	410	TAME = 4.8 1,2-Dichloroethane=6.4 TBA = 12 All others ND<0.50-50	—
Monitoring well top of casings resurveyed 8/15/02											
12/6/2002	129.94	9.06	360	ND<50	ND<0.50	ND<0.50	ND<0.50	0.71	500	TBA=29 TAME=5.9 1,2-Dichloroethane=14 All others ND<1.0	—
2/24/2003	133.79	5.21	270	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	360	TBA=36 1,2-Dichloroethane=7.5 All others ND<1.0	—
5/15/2003	133.09	5.91	200	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	130	TBA=23 1,2-Dichloroethane=1.2 All others ND<1.0	—
8/11/2003	131.66	7.34	150	—	ND<0.50	ND<0.50	ND<0.50	0.81	190	TBA=24 TAME=1.6 1,2-Dichloroethane=2.3 All others ND<1.0	—
11/11/2003	130.89	8.11	170	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	250	TAME=2.4 1,2-Dichloroethane=5.8 All others ND<1.0-20	—
2/17/2004	132.03	6.97	360	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	440	TAME=4.2 All others ND<1.0-10	—
5/10/2004	133.19	5.81	250	—	1.4	ND<0.50	ND<0.50	4.3	160	TBA=47 TAME=1.5 All others ND<1.0	—
8/17/2004	130.57	8.43	470	—	ND<0.50	ND<0.50	ND<0.50	ND<0.50	430	TAME=4.4 All others ND<1.0-50	—

NOTES:

Wells re-surveyed 8/15/02 by R. Smith, LS, using Caltrans HPGN monument "D CA 01 NC" south of Rio Dell @ Jordan Road/Hwy 254 (Pepperwood) off-ramp

TABLE 2: HISTORIC GRADIENT DATA  
 Former Rio Dell Texaco, 100 Wildwood Ave., Rio Dell, CA  
 LACO No. 3554.03; LOP No. 12691

Date	North		South	
	Gradient	Slope	Gradient	Slope
6/30/2000	S68W	6.20%	---	---
7/31/2000	S78W	4.70%	---	---
8/30/2000	S33W	8.20%	---	---
9/22/2000	S52E	0.60%	---	---
10/26/2000	S40E	0.70%	---	---
11/24/2000	S34E	8.20%	S61E	6.40%
12/12/2000	S27E	8.30%	S45E	10.50%
1/12/2001	S33E	7.80%	S44E	8.80%
2/22/2001	S32E	6.70%	S40E	7.80%
4/5/2001	S30E	7.10%	S47E	8.40%
5/2/2001	S30E	6.80%	S48E	8.20%
5/22/2001	S41E	5.80%	S52E	6.20%
6/11/2001	S42E	6.20%	S46E	7.10%
7/6/2001	S34E	6.20%	S52E	7.00%
9/4/2001	S34E	5.50%	S54E	7.30%
11/29/2001	S26E	8.80%	---	---
2/28/2002	S35E	3.90%	---	---
5/20/2002	S63E	6.40%	---	---
8/8/2002	S35E	6.50%	---	---
12/6/2002	S35E	7.30%	---	---
2/24/2003	S35E	6.40%	---	---
5/15/2003	S35E	7.20%	---	---
8/11/2003	S30E	6.30%	---	---
11/11/2003	S31E	8.94%	---	---

---

**Attachment 2**  
**Field Notes**



## CONSULTING ENGINEERS &amp; GEOLOGISTS, INC.

480 Hemsted Drive • Redding, CA 96002 • Tel: 530.221.5424 • FAX: 530.221.0135 • E-mail: shninfo@shn-redding.com  
 812 W. Wabash • Eureka, CA 95501 • Tel: 707.441.8855 • FAX: 707.441.8877 • E-mail: shninfo@shn-enqr.com

## DAILY FIELD REPORT

JOB NO

004323

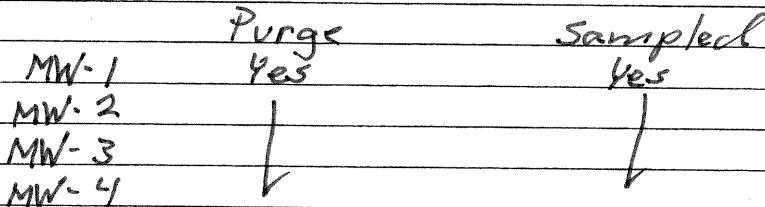
Page of

PROJECT NAME <u>Rio Dell Texaco</u>	CLIENT/OWNER <u>Dorothy Bianchi</u>	DAILY FIELD REPORT SEQUENCE NO	
GENERAL LOCATION OF WORK <u>Rio Dell, Ca</u>	OWNER/CLIENT REPRESENTATIVE <u>Dorothy Bianchi</u>	DATE <u>5/8/06</u>	DAY OF WEEK <u>Mon</u>
TYPE OF WORK <u>Sampling</u>	WEATHER <u>Over Cast</u>	PROJECT ENGINEER/ SUPERVISOR <u>Roland Rucher</u>	
SOURCE & DESCRIPTION OF FILL MATERIAL	KEY PERSONS CONTACTED	TECHNICIAN <u>Dustin Tibbets</u>	

DESCRIBE EQUIPMENT USED FOR HAULING, SPREADING, WATERING, CONDITIONING, &amp; COMPACTING

- 0936 On site. Open up all wells, taking water levels and DO readings.
- 1040 Purging MW-3 with a disposable bailer. All purge water was caught in 5gal buckets.
- 1110 Sampled MW-3 with it's bailer. Locked up well. MW-3
- 1123 Purging MW-2 with a disposable bailer. All purge water was caught in 5gal buckets.
- 1150 Sampled MW-2 with it's bailer. All purge water was caught in 5gal buckets. MW-2
- 1200 Purging MW-1 with a disposable bailer. All purge water was caught in 5gal buckets.
- 1215 Sampled MW-1 with it's bailer. Locked up well. MW-1
- 1222 Purging MW-4 with a disposable bailer. All purge water was caught in 5gal buckets.
- 1245 Sampled MW-4 with it's bailer. Not Locked up well. MW-4
- 1250 Cleaned and loaded up
- 1255 Off site.

Note: All purge and decon water was transported to SHN's P.W.S.T. located at 812 W. Wabash Ave.  
Eureka CA. 19 gal. Total.





## EQUIPMENT CALIBRATION SHEET

Name:	<u>Dustin Tibbets</u>			
Project Name:	<u>Rio Dell Texaco</u>			
Reference No.:	<u>004323</u>			
Date:	<u>5/8/06</u>			
Equipment:	<input checked="" type="checkbox"/> pH & EC <input type="checkbox"/> PID <input type="checkbox"/> GTCO <sub>2</sub> <input type="checkbox"/> GTTEL <input type="checkbox"/> Turbidity <input checked="" type="checkbox"/> Other <u>Dissolved Oxygen meter</u>			

### Description of Calibration Procedure and Results:

pH + EC meter calibrated using a 2 buffer method  
with a pH 7.00 and 4.01, meter was set exactly to  
7.00 and 4.01 and conductivity was set at 700 umhos.

DO meter is self calibrating with the  
Altimeter set at 1.



# CONSULTING ENGINEERS & GEOLOGISTS, INC.

812 W. Wabash • Eureka, CA 95501-2138 • 707/441-8855 • FAX: 707/441-8877 • shninfo@shn-enr.com

## Groundwater Elevations



## Water Sampling Data Sheet

Project Name:	Rio Dell Texaco	Date/Time:	5/8/06
Project No.:	004323	Sampler Name:	David R. Payne <sup>Dustin</sup> Tibbets
Location:	Rio Dell, CA	Sample Type:	Ground water
Well #:	MW-1	Weather:	Over Cast
Hydrocarbon Thickness/Depth (feet):	NA	Key Needed:	YES Dolphin

$$\text{Total Well Depth (feet)} - \text{Initial Depth to Water (feet)} = \text{Height of Water Column (feet)} \times \frac{0.163 \text{ gal/ft (2-inch well) /} \\ 0.653 \text{ gal/ft (4-inch well)}}{=} \text{1 Casing Volume (gal)}$$

15.07	-	8.62	=	6.45	$\times$	0.163	$=$	1.03 \times 3 = 3.10
-------	---	------	---	------	----------	-------	-----	----------------------

Purge Method: Hand Bail

Total Volume Removed: 3.25 (gal)

## Laboratory Information

Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
MW-1	3 - 40ml UON's	YES HCL	NCL	8260 list 1

Well Condition:

#### Remarks:

Recharged to 11.21 at sampling Time - 12/15



' CONSULTING ENGINEERS & GEOLOGISTS, INC.

812 W. Wabash • Eureka, CA 95501-2138 • 707/441-8855 • FAX: 707/441-8877 • shninfo@shn-enr.com

## Water Sampling Data Sheet

Project Name:	Rio Dell Texaco	Date/Time:	5/8/06
Project No.:	004323	Sampler Name:	<del>David R. Paine</del> <sup>Dustin</sup> <del>Tibbles</del>
Location:	Rio Dell, CA	Sample Type:	Ground water
Well #:	MW-2	Weather:	Overscast
Hydrocarbon Thickness/Depth (feet):	NA	Key Needed:	YES <u>Dolphin</u>

Total Well Depth (feet)	-	Initial Depth to Water (feet)	=	Height of Water Column (feet)	x	$0.163 \text{ gal/ft (2-inch well) /}$ $0.653 \text{ gal/ft (4-inch well)}$	=	1 Casing Volume (gal)
15.00	-	5.29	=	9.71	x	0.163	=	1.55 x 3 = 4.66

Purge Method: Hand Baril

Total Volume Removed: 6.35 (gal)

## Laboratory Information

Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
MW-2	3 - 40ml vials	yes HCl	NCL	8260 list 1

Well Condition:

Remarks:

Recharged to 12.50 at sampling Time 1150



## Water Sampling Data Sheet

Project Name:	Rio Dell Texaco	Date/Time:	5/8/06
Project No.:	004323	Sampler Name:	<del>David R. Paine</del> <sup>Dustin</sup> Tibbets
Location:	Rio Dell, CA	Sample Type:	Ground water
Well #:	MW-3	Weather:	Over Cast
Hydrocarbon Thickness/Depth (feet):	NA	Key Needed:	YES <u>Dolphin</u>

$$\text{Total Well Depth (feet)} - \text{Initial Depth to Water (feet)} = \text{Height of Water Column (feet)} \times \frac{0.163 \text{ gal/ft (2-inch well) /} \\ 0.653 \text{ gal/ft (4-inch well)}}{=} \text{1 Casing Volume (gal)}$$

14.96	-	2.90	=	12.06	$\times$	0.163	=	1.93 \times 3 = 5.79
-------	---	------	---	-------	----------	-------	---	----------------------

Purge Method: Hand Bail

Total Volume Removed: (gal)

## Laboratory Information

Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
MW-3	3 - 40ml UDA's	YES HCL	NCL	8260 list 1

Well Condition:

Remarks:

Recharged to 9.10 at sampling Time = 1110



# CONSULTING ENGINEERS & GEOLOGISTS, INC.

812 W. Wabash • Eureka, CA 95501-2138 • 707/441-8855 • FAX: 707/441-8877 • shninfo@shn-enqr.com

## Water Sampling Data Sheet

Project Name:	Rio Dell Texaco	Date/Time:	5/8/06
Project No.:	004323	Sampler Name:	David R. Paine <sup>Dustin</sup> Tibbets
Location:	Rio Dell, CA	Sample Type:	Ground water
Well #:	MW-4	Weather:	Overcast
Hydrocarbon Thickness/Depth (feet):	NA	Key Needed:	YES      Dolphin

$$\text{Total Well Depth (feet)} - \text{Initial Depth to Water (feet)} = \text{Height of Water Column (feet)} \times \frac{0.163 \text{ gal/ft (2-inch well) /} \\ 0.653 \text{ gal/ft (4-inch well)}}{=} \text{1 Casing Volume (gal)}$$

14.92	-	10.03	=	4.89	$\times$	0.163	$=$	.78x3=2.35
-------	---	-------	---	------	----------	-------	-----	------------

Purge Method: Hand Bail

Total Volume Removed: 2.5 (gal)

## Laboratory Information

Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
MW-4	3 - 40ml UDN's	YES HCl	NCL	8260 list 1

#### Well Condition:

Remarks:

Recharged to 12.33 at sampling Time = 1245

Client Name:

**FORMER RIO DELL TEXACO**

The water from your site:      **100 WILDDWOOD AVENUE, RIO DELL,  
CA; LOP NO. 12691**

SHN ref# **004323**      Collected On: **2/6/2006**

Has been tested and certified as acceptable to be discharged into the City of  
Eureka municipal sewer system.

Amount Discharged:

**21 GALLONS**

Date Discharged:

**4/25/2006**

Certified by: **AARON MELODY**

**SHN CONSULTING ENGINEERS & GEOLOGISTS, INC.**  
City of Eureka Wastewater Discharge Permit #65

Client Name:

**FORMER RIO DELL TEXACO**

The water from your site:

**100 WILDWOOD AVENUE, RIO DELL,  
CA; LOP NO. 12691**

SHN ref #

**004323**

Collected On:

**5/8/2006**

Has been tested and certified as acceptable to be discharged into the City of Eureka municipal sewer system.

Amount Discharged:

**19 GALLONS**

Date Discharged:

**6/6/2006**

Certified by:

**AARON MELODY**

**SHN CONSULTING ENGINEERS & GEOLOGISTS, INC.**

City of Eureka Wastewater Discharge Permit #65

**Attachment 3**

---

**Historic Monitoring Data Collected by SHN**

**Table 3-1**  
**Historic Groundwater Elevations**  
**Former Rio Dell Texaco; Rio Dell, California**

Sample Location	Date	Top of Casing Elevation (feet) <sup>1</sup>	Depth to Water (feet) <sup>2</sup>	Groundwater Elevation (feet) <sup>1</sup>
MW-1	02/11/05	139.06	7.98	131.08
	05/13/05		7.68	131.38
	08/23/05		9.36	129.70
	11/04/05		10.67	128.39
	02/06/06		7.23	131.83
	05/08/06		8.62	130.44
MW-2	02/11/05	139.83	4.84	134.99
	05/13/05		4.43	135.40
	08/23/05		5.77	134.06
	11/04/05		6.90	132.93
	02/06/06		3.10	136.73
	05/08/06		5.29	134.54
MW-3	02/11/05	139.87	2.50	137.37
	05/13/05		2.11	137.76
	08/23/05		4.71	135.16
	11/04/05		4.43	135.44
	02/06/06		1.58	138.29
	05/08/06		2.90	136.97
MW-4	02/11/05	139.00	8.03	130.97
	05/13/05		8.88	130.12
	08/23/05		9.66	129.34
	11/04/05		8.92	130.08
	02/06/06		7.80	131.20
	05/08/06		10.03	128.97

1. Referenced to NAVD88 (North American Vertical Datum 1988)  
2. Below top of casing

**Table 3-2**  
**Historic Groundwater Analytical Results**  
**Former Rio Dell Texaco; Rio Dell, California**  
(in ug/L)<sup>1</sup>

Sample Location	Date	TPHG <sup>2</sup>	B <sup>2</sup>	T <sup>2</sup>	E <sup>2</sup>	X <sup>2</sup>	MTBE <sup>2</sup>	TBA <sup>2</sup>	DIPE <sup>2</sup>	ETBE <sup>2</sup>	TAME <sup>2</sup>
MW-1	02/11/05	57 <sup>3</sup>	<0.50 <sup>4</sup>	<0.50	<0.50	<0.50	46	<10	<1.0	<1.0	<1.0
	05/13/05	<50	<0.50	<0.50	<0.50	<0.50	67	<20	<1.0	<1.0	<1.0
	08/23/05	86 <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	96	<10	<1.0	<1.0	<1.0
	11/04/05	86 <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	94	<10	<1.0	<1.0	<1.0
	02/06/06	<50	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<1.0	<1.0	<1.0
	05/08/06	<50	<0.50	<0.50	<0.50	<0.50	15	<10	<1.0	<1.0	<1.0
MW-2	02/11/05	<50	<0.50	<0.50	<0.50	<0.50	17	<10	<1.0	<1.0	1.2
	05/13/05	<50	<0.50	<0.50	<0.50	<0.50	18	<10	<1.0	<1.0	2.0
	08/23/05	66 <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	60	<10	<1.0	<1.0	2.5
	11/04/05	<50	<0.50	<0.50	<0.50	<0.50	18	<10	<1.0	<1.0	1.6
	02/06/06	<50	<0.50	<0.50	<0.50	<0.50	13	<20	<1.0	<1.0	<1.0
	05/08/06	<50	<0.50	<0.50	<0.50	<0.50	23	<10	<1.0	<1.0	1.1
MW-3	02/11/05	<50	<0.50	<0.50	<0.50	<0.50	<1.0	<10	<1.0	<1.0	<1.0
	05/13/05	<50	<0.50	<0.50	<0.50	<0.50	<1.0	<10	<1.0	<1.0	<1.0
	08/23/05	<50	<0.50	<0.50	<0.50	<0.50	<1.0	<10	<1.0	<1.0	<1.0
	11/04/05	<50	<0.50	<0.50	<0.50	<0.50	<1.0	<10	<1.0	<1.0	<1.0
	02/06/06	<50	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<1.0	<1.0	<1.0
	05/08/06	<50	<0.50	<0.50	<0.50	<0.50	<1.0	<10	<1.0	<1.0	<1.0
MW-4	02/11/05	500 <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	470	30	<1.0	<1.0	4.4
	05/13/05	570 <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	530	45	<1.0	<1.0	6.2
	08/23/05	490 <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	520	<10	<1.0	<1.0	5.6
	11/04/05	420 <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	410	<10	<1.0	<1.0	4.6
	02/06/06	440 <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	340	<20	<1.0	<1.0	4.6
	05/08/06	230 <sup>3</sup>	<0.50	<0.50	<0.50	<0.50	380	<10	<1.0	<1.0	3.9

1. ug/L: micrograms per Liter

2. Total Petroleum Hydrocarbons as Gasoline (TPHG), Benzene (B), Toluene (T), Ethylbenzene (E), total Xylenes (X), Methyl Tertiary-Butyl Ether (MTBE), Tertiary-Butyl Alcohol (TBA), Di-isopropyl Ether (DIPE), Ethyl Tertiary-Butyl Ether (ETBE), and Tertiary-Amyl Methyl Ether (TAME), analyzed in general accordance with United States Environmental Protection Agency (EPA) Method No. 8260B.

3. The gasoline values are primarily from the reported gasoline additives.

4. <: Denotes a value that is "less than" the method detection limit.

**Table 3-3**  
**Historic DO, DCO<sub>2</sub>, and ORP Measurement Results**  
**Former Rio Dell Texaco; Rio Dell, California**

Sample Location	Date	DO <sup>1</sup> (ppm) <sup>2</sup>	DCO <sub>2</sub> <sup>3</sup> (ppm)	ORP <sup>4</sup> (mV) <sup>5</sup>
MW-1	02/11/05	0.75	50	136
	05/13/05	1.44	60	241
	08/23/05	2.04	60	199
	11/04/05	NM	40	127
	02/06/06	5.02	50	NM
	05/08/06	2.98	80	226
MW-2	02/11/05	0.67	60	155
	05/13/05	0.60	70	226
	08/23/05	0.75	50	183
	11/04/05	NM	60	146
	02/06/06	3.27	45	NM
	05/08/06	1.90	80	220
MW-3	02/11/05	0.76	35	167
	05/13/05	1.16	40	207
	08/23/05	0.88	35	144
	11/04/05	NM	30	155
	02/06/06	3.50	35	NM
	05/08/06	2.91	35	222
MW-4	02/11/05	0.85	160	98
	05/13/05	0.56	180	229
	08/23/05	0.76	130	188
	11/04/05	NM	100	131
	02/06/06	4.18	200	NM
	05/08/06	3.81	200	227

1. DO: Dissolved Oxygen, field measured using portable instrumentation  
 2. ppm: parts per million  
 3. DCO<sub>2</sub>: Dissolved Carbon Dioxide, field measured using a field test kit  
 4. ORP: Oxidation-Reduction Potential measured using portable instrumentation  
 5. mV: millivolts

**Table 3-4**  
**Groundwater Geochemical Analytical Results, August 23, 2005**  
**Former Rio Dell Texaco; Rio Dell, California**

Sample Location	Dissolved Iron (ug/L) <sup>1</sup>	Dissolved Manganese (ug/L)	Nitrate (mg/L) <sup>2</sup>	Sulfate (mg/L)	Total Alkalinity (mg/L)
MW-1	150	24	3.0	18	170
MW-2	<100 <sup>3</sup>	1,700	0.15	34	250
MW-3	<100	51	0.97	24	97
MW-4	810	1,800	<0.10	7.5	460

1. ug/L: micrograms per liter

2. mg/L: milligrams per liter

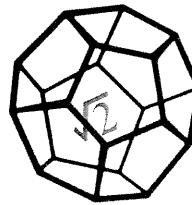
3. <: Denotes a value that is "less than" the method detection limit.

**Attachment 4**

---

**Laboratory Analytical Report**

REPORT DATE 5/3 2006



**NORTH COAST  
LABORATORIES LTD.**

May 17, 2006

SHN Consulting Engineers and Geologists  
812 West Wabash Avenue  
Eureka, CA 95501

Attn: Roland Rueber  
RE: 004323 Rio Dell Texaco

Order No.: 0605174  
Invoice No.: 58194  
PO No.:  
ELAP No. 1247-Expires July 2006

**SAMPLE IDENTIFICATION**

Fraction	Client Sample Description
01A	MW-3
02A	MW-2
03A	MW-1
04A	MW-4

ND = Not Detected at the Reporting Limit

Limit = Reporting Limit

All solid results are expressed on a wet-weight basis unless otherwise noted.

**REPORT CERTIFIED BY**

*Collin Blackstone*

Laboratory Supervisor(s)

*[Signature]*

QA Unit

*[Signature]*

Jesse G. Chaney, Jr.  
Laboratory Director

**CLIENT:** SHN Consulting Engineers and Geologists  
**Project:** 004323 Rio Dell Texaco  
**Lab Order:** 0605174

**CASE NARRATIVE**

## TPH as Gasoline:

The gasoline value for sample MW-4 is primarily from the reported gasoline additives.

Date: 17-May-06  
WorkOrder: 0605174

## ANALYTICAL REPORT

Client Sample ID: MW-3  
Lab ID: 0605174-01A

Received: 5/8/06

Collected: 5/8/06 11:10

Test Name: Gasoline Components/Additives

Reference: LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	ND	1.0	µg/L	1.0		5/16/06
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		5/16/06
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		5/16/06
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		5/16/06
Benzene	ND	0.50	µg/L	1.0		5/16/06
Tert-amyl methyl ether (TAME)	ND	1.0	µg/L	1.0		5/16/06
Toluene	ND	0.50	µg/L	1.0		5/16/06
Ethylbenzene	ND	0.50	µg/L	1.0		5/16/06
m,p-Xylene	ND	0.50	µg/L	1.0		5/16/06
o-Xylene	ND	0.50	µg/L	1.0		5/16/06
Surrogate: 1,4-Dichlorobenzene-d4	94.4	80.8-139	% Rec	1.0		5/16/06

Test Name: TPH as Gasoline

Reference: LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		5/13/06

Client Sample ID: MW-2

Received: 5/8/06

Collected: 5/8/06 11:50

Lab ID: 0605174-02A

Test Name: Gasoline Components/Additives

Reference: LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	23	1.0	µg/L	1.0		5/16/06
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		5/16/06
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		5/16/06
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		5/16/06
Benzene	ND	0.50	µg/L	1.0		5/16/06
Tert-amyl methyl ether (TAME)	1.1	1.0	µg/L	1.0		5/16/06
Toluene	ND	0.50	µg/L	1.0		5/16/06
Ethylbenzene	ND	0.50	µg/L	1.0		5/16/06
m,p-Xylene	ND	0.50	µg/L	1.0		5/16/06
o-Xylene	ND	0.50	µg/L	1.0		5/16/06
Surrogate: 1,4-Dichlorobenzene-d4	95.3	80.8-139	% Rec	1.0		5/16/06

Test Name: TPH as Gasoline

Reference: LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		5/13/06

Date: 17-May-06  
WorkOrder: 0605174

## ANALYTICAL REPORT

Client Sample ID: MW-1  
Lab ID: 0605174-03A

Received: 5/8/06

Collected: 5/8/06 12:15

Test Name: Gasoline Components/Additives

Reference: LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	15	1.0	µg/L	1.0		5/16/06
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		5/16/06
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		5/16/06
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		5/16/06
Benzene	ND	0.50	µg/L	1.0		5/16/06
Tert-amyl methyl ether (TAME)	ND	1.0	µg/L	1.0		5/16/06
Toluene	ND	0.50	µg/L	1.0		5/16/06
Ethylbenzene	ND	0.50	µg/L	1.0		5/16/06
m,p-Xylene	ND	0.50	µg/L	1.0		5/16/06
o-Xylene	ND	0.50	µg/L	1.0		5/16/06
Surrogate: 1,4-Dichlorobenzene-d4	94.6	80.8-139	% Rec	1.0		5/16/06

Test Name: TPH as Gasoline

Reference: LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		5/13/06

Client Sample ID: MW-4

Received: 5/8/06

Collected: 5/8/06 12:45

Lab ID: 0605174-04A

Test Name: Gasoline Components/Additives

Reference: LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	380	50	µg/L	50		5/16/06
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		5/16/06
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		5/16/06
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		5/16/06
Benzene	ND	0.50	µg/L	1.0		5/16/06
Tert-amyl methyl ether (TAME)	3.9	1.0	µg/L	1.0		5/16/06
Toluene	ND	0.50	µg/L	1.0		5/16/06
Ethylbenzene	ND	0.50	µg/L	1.0		5/16/06
m,p-Xylene	ND	0.50	µg/L	1.0		5/16/06
o-Xylene	ND	0.50	µg/L	1.0		5/16/06
Surrogate: 1,4-Dichlorobenzene-d4	95.2	80.8-139	% Rec	1.0		5/16/06

Test Name: TPH as Gasoline

Reference: LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	230	50	µg/L	1.0		5/13/06

# North Coast Laboratories, Ltd.

Date: 17-May-06

**CLIENT:** SHN Consulting Engineers and Geologists  
**Work Order:** 0605174  
**Project:** 004323 Rio Dell Texaco

## QC SUMMARY REPORT

Method Blank

Sample ID	MB 051506	Batch ID:	R41299	Test Code:	8260OXYW	Units:	µg/L	Analysis Date	5/16/06 9:28:00 AM	Prep Date		
Client ID:		Run ID:		ORGCMS3_060515A		SeqNo:		592706				
Analyte		Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	1.0										
Tert-butyl alcohol (TBA)	ND	1.0										
Di-isopropyl ether (DIPE)	ND	1.0										
Ethyl tert-butyl ether (ETBE)	ND	1.0										
Benzene	ND	0.50										
Tert-amyl methyl ether (TAME)	ND	1.0										
Toluene	ND	0.50										
Ethylbenzene	ND	0.50										
m,p-Xylene	ND	0.50										
o-Xylene	ND	0.50										
1,4-Dichlorobenzene-d4	0.923	0.10	1.00	0		92.3%	81	139	0			
Sample ID	MB 051206	Batch ID:	R41276	Test Code:	GASW-MS	Units:	µg/L	Analysis Date	5/12/06 7:07:00 AM	Prep Date		
Client ID:		Run ID:		ORGCMS2_060512A		SeqNo:		592405				
Analyte		Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Gasoline		16.38	50									J

**Qualifiers:** ND - Not Detected at the Reporting Limit  
J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

# North Coast Laboratories, Ltd.

Date: 17-May-06

**CLIENT:** SHN Consulting Engineers and Geologists  
**Work Order:** 0605174  
**Project:** 004323 Rio Dell Texaco

## QC SUMMARY REPORT

Laboratory Control Spike

Sample ID	Batch ID:	Test Code:	Units: µg/L	Analysis Date 5/15/06 3:23:00 AM			Prep Date				
Client ID:		Run ID:	ORGCMSS3_060515A	SeqNo: 592704							
Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	% RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	16.98	1.0	20.0	0	84.9%	80	120				
Tert-butyl alcohol (TBA)	372.8	10	400	0	93.2%	25	162				
Di-isopropyl ether (DIPE)	17.73	1.0	20.0	0	88.6%	80	120				
Ethyl tert-butyl ether (ETBE)	17.64	1.0	20.0	0	88.2%	77	120				
Benzene	17.07	0.50	20.0	0	85.3%	78	117				
Terti-amyyl methyl ether (TAME)	18.90	1.0	20.0	0	94.5%	64	136				
Toluene	18.35	0.50	20.0	0	91.8%	80	120				
Ethylbenzene	17.85	0.50	20.0	0	89.3%	80	120				
m,p-Xylene	35.71	0.50	40.0	0	89.3%	80	120				
o-Xylene	21.03	0.50	20.0	0	105%	80	120				
1,4-Dichlorobenzene-d4	0.965	0.10	1.00	0	96.5%	81	139				
Sample ID	Batch ID:	Test Code:	Units: µg/L	Analysis Date 5/15/06 3:48:00 AM			Prep Date				
Client ID:		Run ID:	ORGCMSS3_060515A	SeqNo: 592705							
Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	% RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	16.93	1.0	20.0	0	84.6%	80	120				
Tert-butyl alcohol (TBA)	374.3	10	400	0	93.6%	25	162				
Di-isopropyl ether (DIPE)	17.66	1.0	20.0	0	88.3%	80	120				
Ethyl tert-butyl ether (ETBE)	17.69	1.0	20.0	0	88.5%	77	120				
Benzene	16.94	0.50	20.0	0	84.7%	78	117				
Terti-amyyl methyl ether (TAME)	18.92	1.0	20.0	0	94.6%	64	136				
Toluene	17.96	0.50	20.0	0	89.8%	80	120				
Ethylbenzene	17.55	0.50	20.0	0	87.7%	80	120				
m,p-Xylene	35.83	0.50	40.0	0	89.6%	80	120				
o-Xylene	20.87	0.50	20.0	0	104%	80	120				
1,4-Dichlorobenzene-d4	0.967	0.10	1.00	0	96.7%	81	139				

Qualifiers:

NND - Not Detected at the Reporting Limit  
J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

**CLIENT:** SHN Consulting Engineers and Geologists  
**Work Order:** 0605174  
**Project:** 004323 Rio Dell Texaco

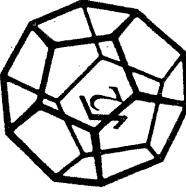
**QC SUMMARY REPORT**  
Laboratory Control Spike

Sample ID	Batch ID:	Test Code:	Units:	Analysis Date	Prep Date
Client ID:		Run ID:	µg/L		
Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec
TPHC Gasoline	957.6	50	1,000	0	95.8%
Sample ID	LCSD-06290	Batch ID: R41276	Test Code: GASW-MS	Analysis Date 5/12/06 5:30:00 AM	Prep Date
Client ID:		Run ID: ORGCMS2_060512A	Units: µg/L		
Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec
TPHC Gasoline	809.8	50	1,000	0	81.0%
Sample ID	Batch ID:	Test Code:	Units:	Analysis Date	Prep Date
Client ID:		Run ID:	µg/L		
Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec
TPHC Gasoline	809.8	50	1,000	0	80.1%

**Qualifiers:** ND - Not Detected at the Reporting Limit  
J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank



**NORTH COAST**  
LABORATORIES LTD.

---

5680 West End Road • Arcata • CA 95521-9202  
707-822-4649 Fax 707-822-6831

## **Chain of Custody**

Attention:	<u>Roland Rueber</u>
Results & Invoice to:	<u>SHN</u>
Address:	<u>812 West Wabash Avenue</u>
	<u>Eureka, CA 95501</u>
Phone:	<u>441-8855</u>
Copies of Report to:	<u>_____</u>
Sampler (Sign & Print):	<u>Dale Schmitz</u>

**PROJECT INFORMATION**

Project Number:	<u>004323</u>
Project Name:	<u>Riv Dell Texaco</u>
Purchase Order Number:	<u>_____</u>

\***MATRIX:** DW=Drinking Water; Eff=Effluent; Inf=Influent; SW=Surface Water; GW=Ground Water; S=Soil; O=Other

**ALL CONTAMINATED NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT**